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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/511,759

10/19/2004

Kari Pajukoski

059864.00981

4940

32294 7590 05/13/2008
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EXAMINER

NGUYEN, LEON VIET Q

ART UNIT

PAPER NUMBER

2611

MAIL DATE

DELIVERY MODE

05/13/2008

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/511,759	Applicant(s) PAJUKOSKI, KARI	
	Examiner LEON-VIET Q. NGUYEN	Art Unit 2611	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 07 March 2008.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-38 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 19-21, 29-34 and 36-38 is/are allowed.
- 6) ☒ Claim(s) 1-18, 22-28 and 35 is/are rejected.
- 7) ☒ Claim(s) 12 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 19 October 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Response to Arguments

1. This office action is in response to communication filed on 3/7/08. Claims 1-38 are pending on this application.
2. Applicant's arguments, see Remarks, filed 7/9/07, with respect to the rejection(s) of claim(s) 1-38 under 35 USC 103(a) have been fully considered and are persuasive. Therefore, the rejection has been withdrawn. However, upon further consideration, a new ground(s) of rejection is made in view of Matsuoka et al (US6418173), Shearer, III (US20030063682), Uta et al (US6144694), Piirainen et al (US20030219079A1), Pierzga et al (US20020114270A1), Currivan et al (US7110434), Zehavi (US5602833) and Billsberry (US20030001669).

Response to Remarks

Re claim 1, applicant argues that Matsuoka fails to teach determining "an error signal using the transmissible signal and the limiting signal" and that the distortion compensation section 107 does not use the transmission signal 116 to generate distortion compensation signal 119 (Remarks page 5 second paragraph).

Although examiner agrees that the distortion compensation section 107 does not use the transmission signal 116 to generate distortion compensation signal 119, Matsuoka does teach determining an error signal using the transmissible signal and the limiting signal. With reference to fig. 1, the distortion compensation signal 119,

generated in distortion compensation section 107, is interpreted as the error signal. This signal is generated using amplitude limiting signal 116, which is merely a transmission signal with limited amplitude (col. 5 lines 13-16). Therefore signal 116 is interpreted to be a transmissible signal. Furthermore, distortion compensation signal 119 is generated from a distortion compensation coefficient 118, which is interpreted to be a limiting signal. Distortion compensation coefficient 118 is generated in response to limiting amplitude information 117, which is generated from the amplitude limited transmission 116 and the second amplitude calculating section 105 (col. 5 lines 26-30). Therefore a limiting signal 118 is indirectly determined from a transmissible signal 116. Also, both elements 103 and 105 perform the same function as a pulse shaping filter, which limits the amplitude of a signal.

As a result, the error signal 119 is determined using a transmissible signal 116 and a limiting signal 118.

Applicant also argues that the distortion compensation section 107 of Matsuoka generates a distortion compensation signal 119, which is later used by a quadrature modulating section 108 to modulate RF signals, which are signals 119 of carrier band (Remarks page 6 second paragraph). Applicant goes on to argue that the distortion compensation signal 119 as taught by Matsuoka is later used by a quadrature modulating section 108 to modulate RF signals and that the error signal in claim 1 is not used subsequently to modulate RF signals (Remarks page 6 second paragraph).

Examiner agrees. However, in response to applicant's argument that the references fail to show certain features of applicant's invention, it is noted that the features upon which applicant relies (i.e., the function of the error signal) are not recited in the rejected claim(s). Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

Applicant argues that Matsuoka fails to teach "determining a limiting signal from a transmissible signal filtered using a pulse shaping filter" (Remarks page 7 second paragraph). Applicant asserts that the amplitude limiting section does not filter the signal using a pulse shaping filter (Remarks page 7 second paragraph).

Examiner agrees, however it is noted that Shearer, III is relied upon to teach the use of a pulse shaping filter to filter the signal (previous office action pages 7 and 8). Furthermore, limiting the amplitude of a pulse is essentially the same as shaping the pulse, regardless of whether a filter is used. Both perform the same function.

Furthermore applicant argues that Matsuoka fails to teach "generating a limited transmissible signal by reducing an orthogonalized error signal filtered using the filter matched to a chip pulse waveform from the transmissible signal" since Matsuoka is devoid of any teaching providing a reduction of an error signal filtered using the filter matched to a chip pulse waveform from the transmissible signal (Remarks page 7 last paragraph).

Examiner agrees. However, as previous stated above, Shearer III is relied upon to teach the use of a pulse shaping filter to filter the signal (previous office action pages 7 and 8).

Applicant also argues, with respect to claim 2, that Shearer generally describes using a pulse-shaped filter to shape and spread information conveyed in each unit interval of modulated data over many unit intervals (Remarks page 8 second paragraph). Applicant further argues that Shearer fails to teach determining an error signal using the transmissible signal and the limiting signal;" determining "a limiting signal from a transmissible signal filtered using a pulse shaping filter;" or generating "a limited transmissible signal by reducing an orthogonalized error signal filtered using the filter matched to a chip pulse waveform from the transmissible signal".

Examiner respectfully disagrees. Although Shearer alone fails to teach all of the claimed limitations, the combination of Matsuoka and Shearer would render the claims obvious to one of ordinary skill in the art (see the new rejection below).

Regarding claim 3, applicant argues that Matsuoka fails to teach "generating limited transmissible signals by reducing each error signal part filtered using the filter matched to a chip pulse waveform for a corresponding transmissible signal" (Remarks page 10 last paragraph – page 11 first paragraph).

The argument has been responded to with respect to claim 1 above.

Furthermore, applicant argues that Matsuoka fails to teach “combining at least two signals modulated on different carrier to a combination signal”, “determining a limiting signal from the combination signal filtered using a pulse shaping filter”, or “determining an error signal using the combination signal and the limiting signal” (Remarks 11 second paragraph).

Examiner agrees that Matsuoka is silent as to providing a combination signal in the first place. However the Uta reference, which is in the same field of endeavor as Matsuoka’s transmission apparatus, does teach the combination of at least two signals on different channels to form a single signal (11-1 and 11-2 in fig. 8 of Uta). Although Uta does not explicitly teach that each channel corresponds to a different carrier, one of ordinary skill in the art would have found it obvious to use different carriers for each channel to reduce possible interference between the channels. Applying the combination signal of Uta as the transmissible signal 116 of Matsuoka would render claim 3 obvious.

Additionally regarding claim 3, applicant argues that Matsuoka fails to teach “dividing the error signal onto different carriers in a predetermined manner” (Remarks page 12 second paragraph). Applicant further argues that Matsuoka is silent as to whether its modulation of distortion compensation signals involves any division of an error signal onto different carriers carried out in a predetermined manner (Remarks page 12 second paragraph).

Examiner agrees, however the argument is moot in view of the new grounds of rejection.

Regarding claim 18, applicant argues that Shearer fails to teach all the recitations of independent claim 18 and thus fails to cure the Matsuoka deficiencies (Remarks page 13 first paragraph).

Examiner respectfully disagrees. See the response to the argument of claim 1 above.

Applicant further argues that Uta fails to cure the deficiencies of Matsuoka and Shearer (Remarks page 13 second paragraph). In particular, even if Uta describes a combination of at least two signals modulated on different carriers to a combination signal, Uta, like Matsuoka, and Shearer, does not teach or suggest that the transmission apparatus determines "a limiting signal from the combination signal filtered using a pulse shaping filter," as recited in independent claim 3 (Remarks page 14 first paragraph).

Although examiner agrees that Uta alone does not teach determining a limiting signal from the combination signal filtered using a pulse shaping filter, it was previously stated that Matsuoka in view of Shearer teaches determining a limiting signal from a transmissible signal filtered using a pulse shaping filter (see above). Using the combination signal taught by Uta as the transmissible signal of the modified Matsuoka

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method would read on the claimed limitations and one of ordinary skill in the art would have found it obvious to replace one type of signal with another type.

Applicant goes on to argue that neither Matsuoka, nor Shearer, describes that providing a signal that is similar to white noise so that the signals of all channels would have less chance of having the same value simultaneously, as submitted in Uta (Remarks page 14 last paragraph) and that one skilled in the art would not be motivated to modify Matsuoka or Shearer with Uta since there is no description or suggestion in Matsuoka, nor Shearer, of a need to multiplex signals (Remarks page 14 last paragraph).

In response to applicant's argument that there is no suggestion to combine the references, the examiner recognizes that obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. See *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988) and *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992). In this case, Matsuoka nor Shearer describe a signal with characteristics similar to white noise but the references do describe the transmission of various signals. Uta does not teach white noise but signals with characteristics *close* to white noise (col. 3 lines 43-47). One of ordinary skill in the art would find it obvious to interchange signals since Matsuoka, Shearer, and Uta teach wireless communications pertaining to RF signal transmissions.

Regarding claims 8-9 and 26-27, applicant argues that Pirrainen does not cure the deficiencies in Matsuoka and Shearer, in particular failing to disclose or suggest, at least, determining or determine "an error signal using the transmissible signal and the limiting signal;" determining or determine "a limiting signal from a transmissible signal filtered using a pulse shaping filter;" or generating or generate "a limited transmissible signal by reducing an error signal filtered using the filter matched to a chip pulse waveform from the transmissible signal." (Remarks page 17 first paragraph).

See the response above with respect to claim 1 in which it is explained that Matsuoka and Shearer teach the claimed limitations.

Regarding claims 10 and 28, applicant argues that Pierzga does not cure the deficiencies in Matsuoka and Shearer, in particular failing to disclose or suggest, at least, determining or determine "an error signal using the transmissible signal and the limiting signal;" determining or determine "a limiting signal from a transmissible signal filtered using a pulse shaping filter;" or generating or generate "a limited transmissible signal by reducing an error signal filtered using the filter matched to a chip pulse waveform from the transmissible signal." (Remarks page 19 first paragraph).

See the response above with respect to claim 1 in which it is explained that Matsuoka and Shearer teach the claimed limitations.

Regarding claim 13, applicant argues that Currivan does not cure the deficiencies in Matsuoka and Shearer, in particular failing to disclose or suggest, at least, determining "an error signal using the transmissible signal and the limiting signal;" determining "a limiting signal from a transmissible signal filtered using a pulse shaping filter;" or generating "a limited transmissible signal by reducing the orthogonalized error from the transmissible signal." (Remarks page 20 third paragraph).

See the response above with respect to claim 2 in which it is explained that Matsuoka and Shearer teach the claimed limitations.

Regarding claim 14, applicant argues that Zehavi does not cure the deficiencies in Matsuoka and Shearer, in particular failing to disclose or suggest, at least, determining "an error signal using the transmissible signal and the limiting signal;" determining "a limiting signal from a transmissible signal filtered using a pulse shaping filter;" or generating "a limited transmissible signal by reducing the orthogonalized error from the transmissible signal." (Remarks page 22 second paragraph).

See the response above with respect to claim 2 in which it is explained that Matsuoka and Shearer teach the claimed limitations.

Regarding claims 16-17, applicant argues that Billsberry does not cure the deficiencies in Matsuoka, Uta and Shearer, in particular failing to disclose or suggest, at least, generating "limited transmissible signals by reducing each error signal part filtered using the filter matched to a chip pulse waveform from a corresponding transmissible

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signal;" combining "at least two signals modulated on different carriers to a combination signal;" determining "a limiting signal from the combination signal filtered using a pulse shaping filter;" determining "an error signal using the combination signal and the limiting signal;" or dividing "the error signal onto different carriers in a predetermined manner."

(Remarks page 20 third paragraph).

See the response above with respect to claim 3 in which it is explained that Matsuoka, Uta and Shearer teach the claimed limitations.

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

1. Claim 1-2, 4-7, 11, 22-25, and 35 are rejected under 35 U.S.C. 103(a) as being unpatentable over Matsuoka et al (US6418173) in view of Shearer, III (US20030063682).

Re claim 1, Matsuoka teaches a method for limiting a signal in a transmitter (col. 2 lines 31-34) at chip level, the method comprising:

determining a limiting signal (118) from a transmissible signal (116, col. 5 lines 13-16) filtered using a pulse shaping filter (103), and

determining an error signal (the output 119 from 107) using the transmissible signal (116) and the limiting signal (118).

Matsuoka fails to teach generating a limited transmissible signal by reducing an error signal filtered using the filter matched to a chip pulse waveform from the transmissible signal. However Shearer III teaches using a pulse-shaping filter to shape and spread information conveyed in each interval of modulated data (§0002). Furthermore, it is well known in the art that filters reduce the amplitude of a signal.

Therefore taking the combined teachings of Matsuoka and Shearer III as a whole, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the pulse shaping of Shearer into the method of Matsuoka. The motivation to combine Shearer and Matsuoka would be to permit efficient recovery of information without significant intersymbol interference (§0002).

Re claim 2, Matsuoka teaches a method for limiting a signal in a transmitter (col. 2 lines 31-34) at chip level, the method comprising:

determining a limiting signal (118 in fig. 3) from a transmissible signal (116 in fig. 3, col. 5 lines 13-16) filtered using a filter (103 in fig. 3),

determining an error signal (the output 119 from 107) using the transmissible signal (116 in fig. 3) and the limiting signal (118 in fig. 3),

orthogonalizing the error signal (108 in fig. 3) filtered using the filter matched to a chip pulse waveform (107 in fig. 3), and

generating a limited transmissible signal (122 in fig. 3) by reducing the orthogonalized error signal from the transmissible signal (col. 6 lines 10-11, the distortion components includes the distortion compensation signal which is interpreted as the error signal and has a limited or reduced amplitude).

Matsuoka fails to teach where the filter is a pulse shaping filter. However Shearer III teaches using a pulse-shaping filter to shape and spread information conveyed in each interval of modulated data (§0002). Furthermore, it is well known in the art that filters reduce the amplitude of a signal.

Therefore taking the combined teachings of Matsuoka and Shearer III as a whole, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the pulse shaping of Shearer into the method of Matsuoka. The motivation to combine Shearer and Matsuoka would be to permit efficient recovery of information without significant intersymbol interference (§0002).

Re claim 4, Matsuoka the modified invention of teaches a method wherein the transmissible signal is a baseband signal (abstract of Matsuoka, 116 in fig. 1 of Matsuoka).

Re claim 5, the modified invention of Matsuoka teaches a method wherein the limiting signal is a baseband signal (118 in fig. 1 of Matsuoka).

Re claim 6, the modified invention of Matsuoka teaches a method wherein the error signal is a baseband signal (119 in fig. 1 of Matsuoka, the I and Q signals of the distortion compensation signal).

Re claim 7, the modified invention of Matsuoka teaches a method wherein the limiting signal (118 in fig. 1 of Matsuoka) is determined by means of a threshold value set (102 in fig. 1 of Matsuoka) for the power or amplitude values (102 in fig. 1 of Matsuoka, col. 5 lines 5-12).

Re claim 11, the modified invention of Matsuoka teaches a method wherein a second clipping stage is added (105 in fig. 1 of Matsuoka).

Re claim 22, the claim limitations as recited have been analyzed and addressed in the above rejections with respect to claim 4.

Re claim 23, the claim limitations as recited have been analyzed and addressed in the above rejections with respect to claim 5.

Re claim 24, the claim limitations as recited have been analyzed and addressed in the above rejections with respect to claim 6.

Re claim 25, the claim limitations as recited have been analyzed and addressed in the above rejections with respect to claim 7.

Re claim 35, the claim limitations as recited have been analyzed and addressed in the above rejections with respect to claim 1.

2. Claim 3, 15, and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Matsuoka et al (US6418173) in view of Uta et al (US6144694) and further in view of Shearer, III (US20030063682).

Re claim 3, Matsuoka teaches a method for limiting a signal in a transmitter (col. 2 lines 31-34) at chip level, the method comprising:

determining a limiting signal (118 in fig. 3) from the combination signal (116 in fig. 3) filtered using a filter (103 in fig. 3),

determining an error signal (the output 119 from 107 in fig. 3) using the combination signal (116 in fig. 3) and the limiting signal (118 in fig. 3),

dividing the error signal onto different carriers in a predetermined manner (col. 5 lines 33-36),

However Matsuoka fails to teach combining at least two signals modulated on different carriers to a combination signal. Uta teaches combining n different channels into a single multiplexed channel (fig. 8, 11-1 and 11-2 combined in 18).

Therefore taking the combined teachings of Matsuoka and Uta as a whole, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the combination method of Uta into the transmitter of Matsuoka to provide a signal that is similar to white noise so that the signals of all channels have less chance of having the same value simultaneously (col. 1 lines 51-57) and reduce transmission back-off without creating a spurious (col. 2 lines 15-19).

Matsuoka also fails to teach generating limited transmissible signals by reducing each error signal part filtered using the filter matched to a chip pulse waveform from a corresponding transmissible signal. However Shearer III teaches using a pulse-shaping filter to shape and spread information conveyed in each interval of modulated data (¶0002). Furthermore, it is well known in the art that filters reduce the amplitude of a signal.

Therefore taking the combined teachings of Matsuoka and Shearer III as a whole, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the pulse shaping of Shearer into the method of Matsuoka. The motivation to combine Shearer and Matsuoka would be to permit efficient recovery of information without significant intersymbol interference (§0002).

Re claim 15, the modified invention of Matsuoka teaches a method wherein the orthogonalization of the error signal (108 in fig. 3 of Matsuoka) is carried out according to carriers (col. 5 lines 33-36 of Matsuoka).

Re claim 18, the claim limitations as recited have been analyzed and addressed in the above rejections with respect to claim 1. It is implied and necessary to have a transmitter to perform the method as claimed. Furthermore, Uta teaches the means for filtering the limited transmissible signals using the pulse-shaping filter (fig. 4, 24a).

Therefore taking the combined teachings of Matsuoka, Shearer and Uta as a whole, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the combination method of Uta into the transmitter of Matsuoka and Shearer. The motivation to combine Matsuoka, Shearer, and Uta would be to limit the bandwidth of an over-sampled signal (col. 1 lines 44-45). It would be obvious to one of ordinary skill in the art that limiting the bandwidth also reduces the unwanted noise.

3. Claims 8-9 and 26-27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Matsuoka et al (US6418173) and Shearer, III (US20030063682) and further in view of Piirainen et al (US20030219079A1).

Re claim 8, the modified invention of Matsuoka teaches a method wherein the limiting signal (118 in fig. 1 of Matsuoka) is determined by means of a threshold value set (102 in fig. 1 of Matsuoka) for the power or amplitude values (102 in fig. 1 of Matsuoka, col. 5 lines 5-12 of Matsuoka). However Matsuoka fails to teach the threshold value being set bearing in mind the maximum value predetermined for an error vector magnitude.

Piirainen teaches considering the allowed maximum value of the error vector magnitude, or EVM, when determining a threshold value (§0031).

Therefore taking the modified teachings of Matsuoka and Shearer with Piirainen as a whole, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the method of taking the EVM into consideration when formulating threshold values into the transmitter of Matsuoka and Shearer. The motivation to combine Matsuoka, Shearer, and Piirainen would be to improve the quality of modulation (§0034).

Re claim 9, the modified invention of Matsuoka teaches a method wherein the limiting signal (118 in fig. 1 of Matsuoka) is determined by means of a threshold value set (102 in fig. 1 of Matsuoka) for the power or amplitude values (102 in fig. 1 of Matsuoka, col. 5 lines 5-12 of Matsuoka). However Matsuoka fails to teach the

threshold value being set bearing in mind the maximum value predetermined for a peak code domain error.

Piirainen teaches considering the maximum value of the peak code domain error used in WDMA systems when determining a threshold value (¶0031).

Therefore taking the modified teachings of Matsuoka and Shearer with Piirainen as a whole, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the method of taking the peak code domain error into consideration when formulating threshold values into the transmitter of Matsuoka and Shearer. The motivation to combine Matsuoka, Shearer, and Piirainen would be to determine if there is an error in the composed signal resulting from inaccurate modulation (¶0031).

Re claim 26, the claim limitations as recited have been analyzed and addressed in the above rejections with respect to claim 8.

Re claim 27, the claim limitations as recited have been analyzed and addressed in the above rejections with respect to claim 9.

4. Claims 10 and 28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Matsuoka et al (US6418173) and Shearer, III (US20030063682) and further in view of Pierzga et al (US20020114270A1).

Re claim 10, the modified invention of Matsuoka teaches a method

wherein the limiting signal (118 in fig. 1 of Matsuoka) is determined by means of a threshold value set (102 in fig. 1 of Matsuoka) for the power or amplitude values (102 in fig. 1 of Matsuoka, col. 5 lines 5-12 in Matsuoka). However Matsuoka fails to teach the threshold value being set so as to obtain the desired Peak-to-Mean Ratio, Peak-to-Average Ratio, Crest factor of the power or amplitude.

Pierzga teaches the use of a peak-to-mean reduction circuit (132 in fig. 14) to detect whether any samples within a signal period are in excess of a predetermined threshold (§0144).

Therefore taking the modified teachings of Matsuoka and Shearer with Pierzga as a whole, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the reduction circuit of Pierzga into the transmitter of Matsuoka and Shearer. The motivation to combine Matsuoka, Shearer, and Pierzga would be to alleviate the problem of distortion and intermodulation (§0144). Furthermore, it is well known in the art that the peak-to-mean ratio, peak-to-average ratio, and crest factor are inter-related and it would have been obvious and necessitated to use the reduction circuit to reduce the peak-to-average ratio and crest factor.

Re claim 28, the claim limitations as recited have been analyzed and addressed in the above rejections with respect to claim 10.

5. Claim 13 is rejected under 35 U.S.C. 103(a) as being unpatentable over Matsuoka et al (US6418173) and Shearer, III (US20030063682) and further in view of Currivan et al (US7110434).

Re claim 13, the modified invention of Matsuoka fails to teach a method wherein unused codes are utilized in orthogonalization. However Currivan teaches using a linear combination of unused codes to cancel interference (col. 2 lines 31-33), those being orthogonal codes (col. 19 lines 56-58). It is well known in the art that orthogonal transformation is used to facilitate interference cancellation (col. 24 lines 9-14).

Therefore taking the modified teachings of Matsuoka and Shearer with Currivan as a whole, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the use of unused codes as taught by Currivan into the transmitter of Matsuoka and Shearer. The motivation to combine Matsuoka, Shearer, and Currivan would be to cancel interference (col. 2 lines 31-33).

6. Claim 14 is rejected under 35 U.S.C. 103(a) as being unpatentable over Matsuoka et al (US6418173) and Shearer, III (US20030063682) and further in view of Zehavi (US5602833).

Re claim 14, the modified invention of Matsuoka fails to teach a method wherein codes used at a lower modulation level are utilized in orthogonalization. However Zehavi teaches using lower order modulation values of M (col. 18 lines 19-26) to be used in orthogonal functions (col. 18 lines 27-31).

Therefore taking the modified teachings of Matsuoka and Shearer with Zehavi as a whole, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the method of using lower modulation values of

Zehavi into the transmitter of Matsuoka and Shearer. The motivation to combine Matsuoka, Shearer, and Zehavi would be to increase the energy of modulation symbols (col. 18 lines 15-17) and save memory space by re-using codes.

7. Claims 16-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Matsuoka et al (US6418173), Uta et al (US6144694) and Shearer, III (US20030063682) and further in view of Billsberry (US20030001669).

Re claim 16, the modified invention of Matsuoka fails to teach a method wherein the error signal is divided equally between different carriers. However Billsberry teaches the use of an error signal splitter to divide an error signal output into equal strength portions (¶0027).

Therefore taking the modified teachings of Matsuoka, Uta, and Shearer with Billsberry as a whole, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the error signal splitter of Billsberry into the transmitter of Matsuoka, Uta, and Shearer. The motivation to combine Matsuoka, Uta, Shearer, and Billsberry would be to cancel distortion in the signal at the RF output (¶0027).

Re claim 17, the modified invention of Matsuoka fails to teach a method wherein the error signal is divided between different carriers in relation to the power or amplitude values to be clipped. However Billsberry teaches an error splitter that apportions an error signal according to the magnitudes of the signals input into the splitter (¶0027).

Therefore taking the modified teachings of Matsuoka, Uta, and Shearer with Billsberry as a whole, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the error signal splitter of Billsberry into the transmitter of Matsuoka, Uta, and Shearer. The motivation to combine Matsuoka, Uta, Shearer, and Billsberry would be to cancel distortion in the signal at the RF output (¶0027).

Allowable Subject Matter

8. Claims 19-21, 29-34, and 36-38 are allowed.
9. The following is a statement of reasons for the indication of allowable subject matter: The allowable subject matter in independent claims 19-21 and 36-38 pertain to means for determining a first limiting signal from a transmissible signal filtered using a pulse shaping filter, means for determining a first error signal using the transmissible signal and the first limiting signal, means for orthogonalizing the first error signal filtered using the filter matched to a chip pulse waveform, means for generating a first limited transmissible signal by reducing the orthogonalized first error signal from the transmissible signal, means for determining a second limiting signal from the first limited transmissible signal filtered using the pulse shaping filter, means for determining a second error signal using the first limited transmissible signal and the second limiting signal, means for generating a second limited transmissible signal by reducing the second error signal filtered using the filter matched to a chip pulse waveform from the

transmissible signal, means for filtering the second limited transmissible signal using the pulse shaping filter.

10. Claim 12 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to LEON-VIET Q. NGUYEN whose telephone number is (571)270-1185. The examiner can normally be reached on monday-friday, alternate friday off, 7:30AM-5PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David C. Payne can be reached on 571-272-3024. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Art Unit: 2611

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/Leon-Viet Q Nguyen/
Examiner, Art Unit 2611

/David C. Payne/

Supervisory Patent Examiner, Art Unit 2611

Application/Control Number: 10/511,759
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